

“Diabetes Management in the School Setting” Manual Updates

This packet contains updates for the “Diabetes Management in the School Setting” manual that were completed in May 2004. Please insert the updates as follows:

- Replace the old Table of Contents with the new one.
- Replace the old Special Acknowledgment section (pages II-IV) with the new one.
- Replace the old pages 1-5 with the new pages 1-5a and “First Steps” tab.
- Replace the old pages 10-11 with the new pages 10-11.
- Replace the old pages 15-16 with the new pages 15-16.
- Replace the old pages 52-57 with the new pages 52-57 and “Overview” tab.
- Replace the old pages 59-60 with the new pages 59-60 and “Nutrition” tab.
- Replace the old pages 63-66 with the new pages 63-66.
- Replace the old pages 70-75 with the new pages 70-75 and “Exercise” tab.
- Replace the old page 82 with the new page 82.
- Replace the old pages 87-88 with the new pages 87-88a.
- Replace the old pages 91-94 with the new pages 91-94 and “Glucose Management” tab.
- Replace the old pages 96-97 with the new pages 96-97.
- Replace the old pages 104-105 with the new pages 104-105.
- Replace the old page 108 with the new page 108.
- Insert the new pages 108a-108b between pages 108 and 109.
- Replace the old pages 109-112 with the new pages 109-112 and “References” tab.
(NOTE: The “Additional Information and Resources” and “Resource Websites” sections have been combined into one section entitled, “Local and National Resources.”)
- Replace the old page 119 with the new page 119.
- Replace the old page 129 with the new page 129.
- Replace the old pages 134-135 with the new pages 134-135.

A previous packet of updates for the diabetes school manual dated June 2003 was distributed in 2003. The June 2003 updates and the enclosed manual updates are available in electronic format via our school manual web page at <http://www.dhss.state.mo.us/diabetes/manual/manual.htm>. The updates can be down-loaded or printed from the web page as complete files. The updates have also been incorporated into the appropriate manual sections on the web page.

If you have questions regarding the enclosed school manual updates or need a copy of the original school manual, please contact Diane C. Rackers at the Missouri Diabetes Prevention and Control Program at (573) 522-2873 or racked@dhss.mo.gov.

Table of Contents

<i>Special Acknowledgement</i>	II-IV
Developing a Diabetes Management Program in Your School.....	1
First Steps – Index	
First Steps Checklist	2
Diabetes Health History Form and Management Planning Tool.....	3-4a
Draft HIPAA-Compliant Authorization for Exchange of Health & Education Information - Sample	5
Draft HIPAA-Compliant Authorization for Release of Health Information - Sample.....	5a
Prescription Medication Order and Permission to Administer Medication and to Test Blood Sugar Form.....	6
Sample Letter to Health Care Provider Regarding Health Care Plan.....	7
Emergency Action Plan – Diabetes Healthcare (Sample #1)	8-9
Health Services Department Emergency Plan – Diabetes (Sample #2)	10
Staff Training Record	11
Blood Glucose and Insulin Procedures.....	12
Expectations of the Student in Diabetes Care.....	13
Health Services Blood Glucose Record.....	14
504 Dietary Plan – Sample	15
Meal Plan Sample	16
Individualized Health Plan (IHP) Sample	17-20
Individualized Health Plan (IHP) Blank Form	21
Special Health Care Needs: Administrative Guidelines (504 Plan)	22-25
Guidelines for Developing Health Care Action Plans	26-28
Appendix C.1 National Association of School Nurses Position Statement on Case Management of Children with Special Health Care Needs	29-30
Appendix C.2 National Association of School Nurses Position Statement on School Nurse Role in Care and Management of the Child With Diabetes in the School Setting	31-32
Appendix C.3 National Association of School Nurses Position Statement on Using Assistive Personnel in School Health Services Programs.....	33-34
Appendix C.4 Missouri State Board of Nursing Position Statement on Utilization of Unlicensed Health Care Personnel	35
Appendix C.5 The National Association of State School Nurse Consultants, Inc. Position Statement on Delegation of School Health Services	36-37

Appendix C.6 National Association of School Nurses Position Statement on Delegation	38-39
Appendix F.1 Student Section 504 Accommodation Plan.....	40
Appendix F.2 Technical Skills and Services to Meet the Health Care Needs of Students in the School Setting	41a-41h
Appendix F.3 Competencies of Personnel Providing Health Services in Schools	42-43
Appendix F.4 Individualized Health Care Action Plan - Sample	44a-44d
Appendix F.5 Emergency Action Plan - Sample	45
Appendix F.6 Transportation Plan for Student With Special Health Care Needs	46-47
Appendix F.7 Care of Equipment	48-49
Appendix F.8 Sample Letter to Physician Regarding Health Care Plan	50
Appendix F.9 Resources for Special Health Care Needs	51

Overview – Index

Pathophysiology of Diabetes	52-53
Rights of Children with Diabetes in the Public Schools.....	54
Why is Type 2 Diabetes in Children on the Rise?	55
Type 2 Diabetes in Children and Adolescents.....	56-57
Acanthosis Nigricans	58

Nutrition – Index

Nutrition Guidelines for Diabetes	59-60
Eating Healthy With the Diabetes Food Pyramid.....	61-62
The Diabetes Food Pyramid.....	63
Classroom Snacks	64-66
Eating Disorders and Diabetes.....	67-69
504 Dietary Plan - Sample	70
Meal Plan - Sample.....	71

Exercise – Index

Exercise and Diabetes	72
Additional Food for Activity	73
Exercise Safety Tips	74-75
Activity Pyramid for Kids.....	76-77

Medications – Index

Insulin and Insulin Therapy	78-80
Injection Sites.....	81
Insulin Action Times.....	82
Insulin Delivery Systems	83-84
Insulin Pumps in the School Setting	85-86
Guidelines for Troubleshooting Insulin Pumps in the School	86a-86d
Disposing of Sharps Safely	87
Oral Agents for Type 2 Diabetes	88-88a
Effects of Over-the-Counter and Prescription Medications on Diabetes Control	89-90

Glucose Management – Index

Monitoring Glucose Control.....	91-92
Recommended Guidelines for Blood Glucose Control	93-94
From the School Nurse – Subject: Diabetes	95
National Association of School Nurses Position Statement on Blood Sugar Monitoring in the School Setting.....	95a
Treatment of Low Blood Sugars.....	96
Carbohydrates for Treatment of Low Blood Sugar Management	97
Diabetes: Low Blood Sugar Emergencies (JDRF)	98-99
Hypoglycemia (English & Spanish) Handout	100-101
Hyperglycemia (English & Spanish) Handout	102-103
What is Glucagon?.....	104
Treatment of High Blood Sugars	105

Emergency Action Plan(s) & Planning Tools – Index

Emergency Action Plan – Diabetes Healthcare (Sample #1)	106-107
Health Services Department Emergency Plan – Diabetes (Sample #2)	108
Hypoglycemia (Low Blood Sugar) Quick Reference Emergency Planning Tool	108a
Hyperglycemia (High Blood Sugar) Quick Reference Emergency Planning Tool	108b

References – Index

Local and National Resources	109-112
Children’s Hospitals & Facilities.....	113-114
Wizdom Kit from the American Diabetes Association	115
Bag of Hope, Teen Pack, and Family Network Programs from the Juvenile Diabetes Research Foundation (JDRF)	116
Famous People with Diabetes.....	117-118
Types of Insulin	119
Insulin Pump Resources	120-122
Glossary	123-126
References.....	127-128
Forms Index	129

Project Survey Form – Index

“Diabetes Management in the School Setting” Resource Guide Product Survey Form	130
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Health Management – Index

Health Management.....	131-132
Standards of Clinical Care for Children	133
Sick Day Rules	134-135
Depression and Diabetes.....	136-137

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Eli Lilly & Company

*Missouri Department of Health and Senior Services
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Missouri Association of School Nurses

Animas Corporation

Developing A Diabetes Management Program In Your School

A diabetes management program indicates a responsiveness of school personnel to meet the needs of students with diabetes. Creating procedures that outline responsibilities should alleviate anxiety personnel may have about helping students who have diabetes.

A management program should include:

- A plan for communicating with the parent/guardian and the medical provider
- School policies and procedures for administering medications and handling body fluids as encountered with blood sugar monitoring
- Specific actions for school personnel to perform in the management program

The registered professional school nurse coordinates, plans, and implements an effective diabetes management plan. If the school district does not employ a school nurse, it is imperative that the student's physician or health care provider and local public health department are notified for assistance.

The school nurse is responsible for the development of an Individualized Health Plan (IHP), which identifies and documents an individual student's health care needs. Critical to the success in

establishment of an IHP is the use of a systematic approach to problem-solving particular to the nursing process and identified as the Standards of Clinical Nursing Practice (ANA, 1996). These standards are Assessment, Diagnosis, Outcome Identification, Planning, Implementation, and Evaluation. See sample IHP in First Steps section. In developing the IHP, the school nurse needs to collect information to develop the following, that become a part of the student's overall diabetes management plan:

- A comprehensive diabetes health history
- An Emergency Action Plan that describes a specific plan for handling high and low blood sugar episodes, including appropriate treatment of foods and medications
- Blood glucose and insulin procedures for student self-monitoring and administration of insulin
- Dietary plan that identifies student meal and snack times, additional appropriate snack foods for low blood sugar treatment, and a 504 plan if warranted

Adapted from: "Diabetes Management in the School Setting", 1998, Missouri Association of School Nurses.

First Steps

The following steps are what the school health nurse should do when a newly diagnosed student with diabetes is seen or presents. These steps are in sequential order and the forms mentioned and included in the manual will give you all of the tools needed to complete these steps. It is recommended that you prepare your student's file prior to school starting so all necessary paperwork and approval signatures can be obtained.

1. School nurse initiates the ***Diabetes Health History Form and Management Planning Tool*** and arranges for a family conference prior to the student's entry or return to school.
 - The American Diabetes Association's curriculum "***Diabetes Care Tasks at School: What Key Personnel Need to Know***" that can be accessed at: <http://www.diabetes.org/schooltraining>
 - The National Diabetes Education Program (NDEP) school manual "***Helping the Student with Diabetes Succeed: A Guide for School Personnel***" Section 2, "***Actions for School Personnel, Parents and Students***", pages 32-46.
2. School nurse interviews the parent/guardian; completes the ***Diabetes Health History Form and Management Planning Tool***, a ***HIPAA-Compliant Authorization for Exchange of Health & Education Information***, and a ***HIPAA-Compliant Authorization for Release of Health Information***; and has the forms signed by the parent/guardian. At this time, the school nurse provides the parent/guardian with the ***Prescription Medication Order and Permission to Administer Medication and to Test Blood Sugar Form*** to be completed by the health care provider and returned to the school nurse to keep on file.
3. School nurse prepares the ***Letter to Health Care Provider Regarding Health Care Plan*** and sends it to the health care provider with appropriate attachments (i.e., ***Emergency Action Plan Diabetes Healthcare***, etc.).
4. Parent/guardian provides the school with blood glucose monitoring equipment and supplies, medications, and snacks for treatment of hypoglycemia. (Information on glucose monitoring equipment and supplies, and snacks for treatment of hypoglycemia can be found in the Glucose Management section of this manual. Information on medications can be found in the Medications section of this manual.)
5. School nurse trains appropriate designated school staff in emergency action procedures and disseminates information regarding diabetes to appropriate school staff. For example, the classroom teacher and assistant, playground supervisors, lunchroom monitors, bus drivers, coaches, etc. Training of school staff should be documented on the ***Staff Training Record*** and kept in appropriate files. The following resources are appropriate for training school staff:
 - "***Special Health Care Needs: Administrative Guidelines***" - contains information for developing a 504 Plan, as well as sample forms.
 - "***Health Services Department Emergency Plan - Diabetes***" Sample #2, is another example of an Emergency Plan that can be used as an alternative for the Emergency Action Plan Diabetes Healthcare.
6. School nurse completes the ***Blood Glucose and Insulin Procedures*** form after observation of the student (if the student will do self-monitoring at school).
7. School nurse plans for the nutritional needs and supplementary snacks and initiates an appropriate ***504 Dietary Plan*** if indicated. Be sure to communicate with your food service manager to confirm the nutrition content of meals.
8. School nurse initiates and evaluates the student's ***Individualized Health Plan (IHP)*** and makes modifications as needed. (A blank IHP form is provided for the school nurse's convenience.)
9. School nurse maintains consistent communication with student, staff, and parent/guardian, in order to provide for the appropriate plan of care.

Additional forms and resources that are included in this section that will be useful to school staff:

Diabetes Health History Form and Management Planning Tool

The purpose of this form is to aid the school nurse in gathering the information necessary to develop the student's Individualized Health Plan and Emergency Action Plan.

Effective Dates: _____

Student's Name: _____

Date of Birth: _____ Known Allergies: _____

Grade: _____ Homeroom Teacher: _____

Diagnosis: ☐ diabetes type 1 ☐ diabetes type 2 Date of diabetes diagnosis: _____

Last hospitalization/ER visit for diabetes: _____ Has glucagon ever been administered? ☐ Yes ☐ No

CONTACT INFORMATION

Mother/Guardian: _____

Address: _____

Telephone: Home _____ Work _____ Cell _____

Father/Guardian: _____

Address: _____

Telephone: Home _____ Work _____ Cell _____

Student's Doctor/Health Care Provider:

Name: _____

Address: _____

Telephone: _____ Emergency Number: _____

Preferred Hospital: _____

Other Emergency Contacts:

Name: _____

Relationship: _____

Telephone: Home _____ Work _____ Cell _____

Notify parents/guardian or emergency contact in the following situations:

Diabetes Health History Form and Management Planning Tool (*continued*)

BLOOD GLUCOSE MONITORING

Target range for blood glucose is ☐ 70-150 ☐ 70-180 ☐ Other _____

Usual times to check blood glucose _____

Times to do extra blood glucose check (*check all that apply*)

☐ before exercise

☐ after exercise

☐ when student exhibits symptoms of hyperglycemia

☐ when student exhibits symptoms of hypoglycemia

☐ other (explain): _____

Can student perform own blood glucose checks? ☐ Yes ☐ No

Exceptions: _____

Type of blood glucose meter student uses: _____

INSULIN

Type and dosage of insulin: _____ Timing: _____

Type and dosage of insulin: _____ Timing: _____

1. Can student give own injections? ☐ Yes ☐ No

2. Can student determine correct amount of insulin? ☐ Yes ☐ No

3. Can student draw correct dose of insulin? ☐ Yes ☐ No

FOR STUDENTS WITH INSULIN PUMPS

Type of pump: _____ Basal rates _____ 12 am to _____
_____ to _____
_____ to _____

Type of insulin in pump: _____ Type of infusion set _____

Insulin/carbohydrate ratio: _____ Correction factor: _____

Student Pump Abilities/Skills:

Count carbohydrates

Correct bolus amount for carbohydrates consumed

Calculate and administer corrective bolus

Calculate and set basal profiles

Calculate and set temporary basal rate

Disconnect pump

Reconnect pump at infusion set

Prepare reservoir and tubing

Insert infusion set

Troubleshoot alarms and malfunctions

Needs Assistance

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

☐ Yes ☐ No

Diabetes Health History Form and Management Planning Tool (*continued*)

FOR STUDENTS TAKING ORAL DIABETES MEDICATIONS

Type and dosage of medication: _____ Timing: _____

Other medications: _____ Timing: _____

Other medications: _____ Timing: _____

MEALS AND SNACKS EATEN AT SCHOOL

Is student independent in carbohydrate calculations and management? ☐ Yes ☐ No

<u>Meal/Snack</u>	<u>Time</u>	<u>Carbohydrate servings/grams</u>
Breakfast	_____	_____
Mid-morning snack	_____	_____
Lunch	_____	_____
Mid-afternoon snack	_____	_____
Dinner	_____	_____

Snack before exercise? ☐ Yes ☐ No

Snack after exercise? ☐ Yes ☐ No

Other times to give snacks and content/amount: _____

Preferred snack foods: _____

Foods to avoid, if any: _____

Instructions for when food is provided to the class (e.g., as part of a class party or food sampling event):

EXERCISE AND SPORTS

A fast-acting carbohydrate such as _____ should be available at the site of exercise or sports.

Restrictions on activity, if any: _____

Student should not exercise if blood glucose level is below _____ mg/dl or above _____ mg/dl or if moderate to large urine ketones are present.

HYPOGLYCEMIA (LOW BLOOD SUGAR)

Usual symptoms of hypoglycemia: _____

Treatment of hypoglycemia: _____

Has glucagon ever been administered? ☐ Yes ☐ No

Diabetes Health History Form and Management Planning Tool (*continued*)

HYPERGLYCEMIA (HIGH BLOOD SUGAR)

Usual symptoms of hyperglycemia: _____

Treatment of hyperglycemia: _____

Urine should be checked for ketones when blood glucose levels are above _____ mg/dl.

Treatment for ketones: _____

SUPPLIES TO BE KEPT AT SCHOOL

_____ Blood glucose meter, blood glucose test
strips, batteries for meter
_____ Lancet device, lancets, gloves, etc.
_____ Urine ketone strips
_____ Insulin vials and syringes

_____ Insulin pump and supplies
_____ Insulin pen, pen needles, insulin cartridges
_____ Fast-acting source of glucose
_____ Carbohydrate containing snack
_____ Glucagon emergency kit

ACKNOWLEDGED AND REVIEWED WITH:

Student's Parent/Guardian

Date

Student's Parent/Guardian

Date

School Nurse

Date

Draft
ABC PUBLIC SCHOOLS
HIPAA-Compliant Authorization for Exchange of Health & Education Information
-Sample-

Patient/ Name: _____ **Date of Birth:** _____

I hereby authorize _____ [insert health care provider name & title]
and _____ [insert name & title of school official] to exchange
health and education information/records for the purpose listed below.

_____ [insert address & telephone of school/school district]

_____ [insert address and telephone of health care provider]

Description:

The health information to be disclosed consists of:

The education information to be disclosed consists of:

Purpose: This information will be used for the following purpose(s):

1. Educational evaluation and program planning
2. Health assessment and planning for health care services and treatment in school
3. Medical evaluation and treatment
4. Other: _____

Authorization

This authorization is valid for one calendar year. It will expire on _____ [insert date]. I understand that I may revoke this authorization at any time by submitting written notice of the withdrawal of my consent. I recognize that health records, once received by the school district, may not be protected by the HIPAA Privacy Rule, but will become education records protected by the Family Educational Rights and Privacy Act. I also understand that if I refuse to sign, such refusal will not interfere with my child's ability to obtain health care.

Parent Signature Date

Student Signature* Date

*If a minor student is authorized to consent to health care without parental consent under federal or state law, only the student shall sign this authorization form. In Connecticut, a competent minor, depending on age, can consent to outpatient mental health care, alcohol and drug abuse treatment, testing for HIV/AIDS, and reproductive health care services.

Copies: Parent or student*

Physician or other health care provider releasing the protected health information

School official requesting/receiving the protected health information

PSA - Rev. 4/15/03

By Connecticut State Department of Education, Nadine Schwab, & Connecticut Chapter, American Academy of Pediatrics; adapted format from Ohio.

Draft

ABC PUBLIC SCHOOLS

HIPAA-Compliant Authorization for Release of Health Information - Sample -

Patient/Student Name: _____ **Date of Birth:** _____

I hereby authorize _____ [insert health care provider name, address and telephone] to release my/my child's health information/records for the purpose listed below to:

_____ [insert name of school official]

_____ [insert name of school/school district]

_____ [insert school address and telephone]

Description:

The information to be disclosed consists of:

Purpose:

This information will be used for the following purpose(s):

Authorization

This authorization is valid for one calendar year. It will expire on _____ [insert date]. I understand that I may revoke this authorization at any time by submitting written notice of the withdrawal of my consent. I recognize that these records, once received by the school district, may not be protected by the HIPAA Privacy Rule, but will become education records protected by the Family Educational Rights and Privacy Act. I also understand that if I refuse to sign, such refusal will not interfere with my child's ability to obtain health care.

Parent Signature Date

Student Signature* Date

*If a minor student is authorized to consent to health care without parental consent under federal or state law, only the student shall sign this authorization form. In Connecticut, a competent minor, depending on age, can consent to outpatient mental health care, alcohol and drug abuse treatment, testing for HIV/AIDS, and reproductive health care services.

Copies: Parent or student*

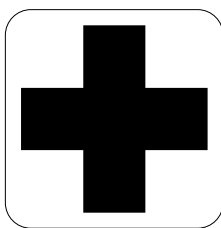
Physician or other health care provider releasing the protected health information

School official requesting/receiving the protected health information

PSA - Rev. 4/15/03

By Connecticut State Department of Education, Nadine Schwab, & Connecticut Chapter, American Academy of Pediatrics; adapted format from Ohio.

(Sample #2)



Health Services Department Emergency Plan DIABETES

In an emergency:

- 1) Stay with child.
- 2) Call/ask someone to call school _____ who will assess child and summon EMS if needed.

<u>IF YOU SEE THIS:</u>	<u>DO THIS:</u>
(Based on this child's current condition, a Medical Emergency for this child is:)	
IF student is not responsive (unconscious, having seizures, or is unable to swallow)	<ul style="list-style-type: none">• CALL 911...Call Parents/Guardians• Don't attempt to give anything by mouth.• Position on side, if possible.• Contact school nurse or trained diabetes personnel.• Administer glucagon, as prescribed.• Stay with student.
IF student is non-responsive, but able to swallow	<ul style="list-style-type: none">• Squirt _____ inside cheek closest to ground.• _____ is kept in _____.• Measure Blood Sugar with monitor (to be done by _____).
IF student is responsive	<ul style="list-style-type: none">• Hypoglycemic (low blood sugar) reaction: IF Blood Sugar reading is _____ or below, then give _____.• Hyperglycemia (high blood sugar) reaction: Keep student walking or sitting and drinking water.• If Blood Sugar is > _____ mg/dl, student, school nurse or assigned person (identify: _____) should check urine for ketones.

IMPORTANT EMERGENCY NUMBERS:

_____	_____
_____	_____
_____	_____

Adapted from: "Diabetes Management in the School Setting", 1998, Missouri Association of School Nurses.
Sample from Lee's Summit School District.

Staff Training Record

<i>Staff Member Name</i>	<i>Date</i>	<i>Training Description*</i>	<i>Signature of Trainer</i>	<i>Notes</i>

*Training Description (e.g., Diabetes Basics, Monitoring, Insulin and Glucagon, Diabetes Emergencies)

The following resources are appropriate for training school staff:

- The American Diabetes Association's curriculum "Diabetes Care Tasks at School: What Key Personnel Need to Know" which can be accessed at: <http://www.diabetes.org/schooltraining>.
- The National Diabetes Education Program (NDEP) school manual "Helping the Student with Diabetes Succeed: A Guide for School Personnel" Section 2, "Actions for School Personnel, Parents and Students", pages 32-46.

504 Dietary Plan

Section 504 of the Rehabilitation Act of 1973 assures handicapped students access to school meal service, even if special meals are needed because of their handicap.

“Handicapped student” means any student who has a physical or mental impairment, which substantially limits one or more life activities, has a record of such an impairment, or is regarded as having such an impairment.

If special meals are needed and requested, certification from a medical doctor or health care provider must 1) verify that special meals are needed because of the handicap, and 2) prescribe the alternate foods and forms needed.

Completion of the following by a student’s physician or health care provider will provide the necessary certification:

NAME OF STUDENT FOR WHOM SPECIAL MEALS ARE REQUESTED:

<u>Food Prescribed</u>	<u>Form Allowed</u> (e.g. fresh, baked, ground, blended, etc.)
Meat & meat alternates	
Milk & milk products	
Bread & cereal	
Fruits & vegetables	
<u>Other Dietary Information and Directions</u>	

I certify the above named student is in need of special school meals prepared from the above-indicated foods and forms because of a handicap.

Physician or Health Care Provider’s Signature

Date

Source: “Diabetes Management in the School Setting”, 1998, Missouri Association of School Nurses.

- Meal Plan Sample on Back -

Meal Plan Sample

Be sure to communicate with your food service manager to confirm the nutrition content of meals.

Meal Plan (Calories) _____ Date _____

Time	Number of Exchanges/Choices	Total Carbohydrate Grams
	____ Carbohydrate group ____ Starch* ____ Fruit ____ Vegetable ____ Milk _____ ____ Meat group _____ ____ Fat group _____	
	____ _____ ____ _____	
	____ Carbohydrate group ____ Starch* ____ Fruit ____ Vegetable ____ Milk _____ ____ Meat group _____ ____ Fat group _____	
	____ _____ ____ _____	
	____ Carbohydrate group ____ Starch* ____ Fruit ____ Vegetable ____ Milk _____ ____ Meat group _____ ____ Fat group _____	
	____ _____ ____ _____	

*Starches include grains (rice, bread, pasta, etc.), beans, starchy vegetables, and foods listed as “other carbohydrates” on the diabetes exchange lists.

The Joslin Diabetes Center at Harvard University has created web-based materials on carbohydrate counting. “Carbohydrate Counting: As easy as 1-2-3” can be accessed at:
<http://www.joslin.harvard.edu/education/library/wcarbsug.shtml/>

Pathophysiology of Diabetes

Diabetes is a chronic metabolic disorder in which the body cannot metabolize carbohydrates, fats, and proteins because of a lack of, or ineffective use of, the hormone insulin. Diabetes is classified into three primary types that are different disease entities but share the symptoms and complications of hyperglycemia (high blood glucose).

Impaired glucose tolerance, formerly known as "borderline diabetes" is a degree of hyperglycemia that may precede type 2 diabetes.

I. Type 1 (previously called insulin dependent diabetes mellitus (IDDM) or juvenile-onset diabetes)

A. Causes

1. Genetic predisposition.
2. Environmental exposure: virus, toxin, stress.
3. Autoimmune reaction: beta-cells that produce insulin in the pancreas are destroyed. When 80-90% of the beta-cells are destroyed, overt symptoms occur.

B. Characteristics

1. Usually occurs before 30 years of age, but can occur at any age. Peak incidence occurs during puberty, around 10-12 years of age in girls and 12-14 years in boys.*
2. Abrupt onset of signs and symptoms of hyperglycemia: increased thirst and hunger, frequent urination, weight loss, and fatigue.
3. Ketosis prone.

C. Treatment

1. Insulin by injection with syringes or pumps
2. Diet
3. Exercise
4. Education
5. Monitoring

II. Type 2 (previously called non-insulin-dependent diabetes mellitus, NIDDM, or adult-onset diabetes)

A. Causes

1. Insulin resistance: unable to utilize insulin that the body makes because of cell-receptor defect; glucose is unable to be absorbed into cells for fuel.
2. Decreased insulin secretion: pancreas does not secrete enough insulin in response to glucose levels.
3. Excess production of glucose from the liver: result of defective insulin secretory response; dawn phenomenon (see glossary) is an example.

B. Characteristics

1. Usually occurs after 30 years of age, but is now occurring in children and adolescents.
2. Increased prevalence in some ethnic groups, e.g., African Americans, Hispanic/Latino, Native Americans, Asian Americans, and Pacific Islanders.
3. Strong genetic predisposition.
4. Frequently obese.
5. Not prone to ketoacidosis until late in course or with prolonged hyperglycemia.
6. May or may not have symptoms of hyperglycemia.
7. May also have extreme tiredness, blurred vision, delayed healing, numbness and tingling of hands and feet, recurring yeast infection.
8. Children between the ages of 10-19 that have one or more of the following are at an increased risk:
 - Family history
 - Member of certain ethnic populations listed above in B.2.
 - Overweight
 - Sedentary lifestyle

* Source: American Diabetes Association. Diabetes Facts. November, 2003.

Pathophysiology of Diabetes

- Pre-puberty.
- Signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans [dirty-neck syndrome], hypertension [high blood pressure], dyslipidemia [lipoproteins imbalance], polycystic ovarian syndrome [PCOS]).

C. Treatment

1. Diet/weight management
2. Exercise/increase physical activity
3. Oral hypoglycemic/antihyperglycemic agents, insulin sensitizers, or insulin
4. Education
5. Monitoring
6. Treatment of comorbid conditions (e.g., hypertension, lipid abnormalities)

III. Gestational Diabetes Mellitus (GDM)

A. Causes

1. Insulin resistance due to pregnancy
2. Genetic predisposition

B. Characteristics

1. Carbohydrate intolerance during pregnancy identified via 1-hour screen using a 50-g oral glucose load (performed between 24th and 28th week of gestation unless otherwise indicated). If the 1-hour screen for glucose is ≥ 140 mg/dl (≥ 7.8 mmol/l), a full diagnostic 100-g, 3-hour oral glucose tolerance test (OGTT) is indicated.

C. Treatment

1. Diet: provide adequate calories without hyperglycemia or ketonemia

2. Exercise: program that does not cause fetal distress, contractions, or hypertension ($>140/90$ mmHg).
3. Insulin: if unable to consistently maintain blood glucose ≤ 95 mg/dl fasting (≤ 5.3 mmol/l) and ≤ 140 mg/dl (≤ 7.8 mmol/l) 1 hour postprandial and ≤ 120 mg/dl (≤ 6.7 mmol/l) 2 hours postprandial.

D. Monitoring

1. Blood glucose: required to determine effectiveness of treatment and possible need for insulin. Glucose should be checked fasting and 1-2 hours postprandial.
2. Ketones: test for ketones using first morning urine sample. Presence of ketones may indicate starvation rather than hyperglycemic ketosis.

For more information about the pathophysiology of diabetes, see the American Diabetes Association's 2004 position statement "Diagnosis and Classification of Diabetes Mellitus" *Diabetes Care*, Volume 27, Supplement 1, pages S5-S10.

For more information about the dyslipidemia often associated with diabetes, please see the American Diabetes Association's 2003 consensus statement, "The Management of Dyslipidemia in Children and Adolescents with Diabetes", *Diabetes Care*, Volume 26, number 7, pages 2194-2197.

Both of the above-mentioned articles can be accessed at: <http://care.diabetesjournals.org/>.

Adapted from: Ballard, A.M., 2000. *Pathophysiology of diabetes*. "The Diabetes Ready-Reference Guide for Health Care Professionals" by the American Diabetes Association.®

Rights of Children with Diabetes in Public Schools

Getting ready for a new school year is demanding. However, if a child has diabetes, the return to school can be even more difficult. Educating school personnel while preparing your child for a new environment can be awesome and overwhelming even when the school administration is supportive. Many parents face school personnel who will not cooperate when trying to arrange for a child's diabetes management during school time. What many parents do not know is that such resistance can, in fact, be illegal.

One of the first legislative steps toward systematically eliminating discrimination against people with disabilities came with the Rehabilitation Act of 1973. Under this law, individuals with disabilities were protected against discrimination in any federally funded program, including the public school system.

Two years later, the Education for All Handicapped children Act of 1975, amended in 1991 and renamed the Individuals with Disabilities Education Act (I.D.E.A.), guarantees a "free, appropriate, public education," including special education and related service programming, to all youth with disabilities who require it.

Many people are not aware that these anti-discriminatory disability laws explicitly cover children with diabetes. All schools receiving federal funds must make reasonable accommodation for the special needs of children with diabetes in order to assure them a "free, appropriate, public education."

In other words, if your child requires snacks in the classroom, freedom to go to the restroom, allowances to participate fully in extracurricular activities without restriction, or any other diabetes-related service, the school is mandated to reasonably accommodate. In fact, I.D.E.A. requires the school to actively seek out children with disabilities, including diabetes, and to work with the parents developing a program that would best suit the child's specific medical needs.

The Department of Education is monitoring the implementation of these various anti-discriminatory education laws. They have scheduled hearings to speak with area advocates about how children with disabilities are being accommodated.

Additional information can be found in the American Diabetes Association's, *Diabetes Care*, Volume 27, Supplement 1, Pages S122-S128, Clinical Practice Recommendations 2004 or visit their website at www.diabetes.org.



Source: "Diabetes Management in the School Setting", 1998, Missouri Association of School Nurses.

Why is Type 2 Diabetes in Children on the Rise?

In 1998, former U.S. Surgeon General David Satcher declared the soaring rate of childhood obesity an epidemic. Data collected by the federal Centers for Disease Control and Prevention (CDC) indicate the prevalence of adult obesity (defined as a body mass index of 25 or more) has soared in the last 30 years.¹ Body mass index (BMI) is a mathematical formula in which a person's body weight in kilograms is divided by the square of his or her height in meters, i.e., wt/ht. Nearly one in five Americans was considered obese in 1998. By 2001, the prevalence of obesity had increased to 20.9%, which was a 5.6% increase from 2000². Although the reasons for the obesity epidemic have not been confirmed, the prevalence of obesity has increased so rapidly, we know its origin is not genetic.³

Former U.S. Surgeon General Dr. C. Everett Koop has said that "except for smoking, obesity is now the number one preventable cause of death in this country."⁴ Obesity may also be the number one preventable risk factor associated with type 2 diabetes in children and adolescents. According to the American Medical Association, losing weight is the single most effective way to reduce the risk of developing diabetes and to manage it.⁵

A healthy diet and exercise are critical to losing weight. Therefore, it is not surprising that research suggests type 2 diabetes may be preventable through proper nutrition and exercise. These, along with blood glucose monitoring and medication treatment methods, should be fully supported by family and health care professionals.⁶

Although type 2 diabetes is a problem among youth, nationally representative data to monitor diabetes trends among youth are not yet available. In response to the growing public health concerns about both type 1 and type 2 diabetes, the CDC and the National Institutes of Health (NIH) are funding a 5-year study, called the SEARCH study, to examine the current

status of diabetes among children and adolescents in the United States.⁶ If the SEARCH study accomplishes its goals, it will provide valuable information to researchers and health care professionals about both types of diabetes.

The specific goals of the SEARCH study are:

- To develop a uniform classification of types of diabetes
- To estimate the number of new and existing childhood diabetes cases by type, age of the child, sex, and racial or ethnic group
- To describe the clinical characteristics of different types of diabetes in youth and how they evolve
- To describe the complications of diabetes in children and adolescents
- To describe the quality of life of children and adolescents with type 2 diabetes⁷

Sources:

¹ Centers for Disease Control and Prevention. Defining overweight and obesity. <http://www.cdc.gov/nccdphp/dnpa/obesity/>

² Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS, Marks JS. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA*. 2003; 289(1):76-9.

³ National Center for Chronic Disease Prevention and Health Promotion. *Chronic Disease Notes & Reports, Preventing Obesity Among Children*. Vol 13 No 1, Winter 2000.

⁴ Koop CE, as quoted by CNN. The Global Spread of Obesity, January 12, 2000.

⁵ American Diabetes Association. Diabetes Type 2: Reducing your risk, 1998, as adapted from Type II Diabetes: Reducing Your Risk, 1996.

⁶ Brosnan CA, Upchurch S, Schreiner B. 2001. Type 2 diabetes in children and adolescents: An emerging disease. *Journal of Pediatric Health Care* 15(4):187-193.

⁷ Centers for Disease Control and Prevention. Fact Sheet: SEARCH for Diabetes in Youth. December 19, 2002. <http://www.cdc.gov/diabetes/pubs/factsheets/search.htm>

Type 2 Diabetes in Children and Adolescents

In 1999, the American Diabetes Association convened a consensus development conference on type 2 diabetes in children and adolescents. This development conference was held to assess present understanding and knowledge, as well as provide guidance to health care providers on the medical management of type 2 diabetes in children and adolescents.

The eight-member panel developed a consensus statement on the six following questions:

1. What is the classification of diabetes in children and adolescents?
2. What is the epidemiology of type 2 diabetes in children and adolescents?
3. What is the pathophysiology of type 2 diabetes in children and adolescents?
4. Who should be tested for diabetes?
5. How should children and adolescents with type 2 diabetes be treated?
6. Can type 2 diabetes in children and adolescents be prevented?

A brief summary of this consensus statement is provided below. For the complete consensus statement, go to the American Diabetes Association's website: <http://care.diabetesjournals.org/cgi/reprint/23/3/381.pdf>

Currently, children with type 2 diabetes are usually diagnosed over the age of 10 years and are in middle to late stage of puberty. As the childhood population

becomes increasingly overweight, type 2 diabetes may be expected to occur among younger prepubertal children.

Only those children who are at substantial risk should be tested for type 2 diabetes. The panel recommended if **the child was overweight and had two or more** of the risk factors listed below, testing should be done every 2 years starting at the age of 10 years or at onset of puberty.

- Family history of type 2 diabetes
- Non-European ethnicity/ancestry
- Signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans [also referred to as “dirty-neck” syndrome], hypertension, dislipidemia, etc.)
- Patient age (starting at the age of 10 years or at onset of puberty)

Consider testing in any other high risk patients who display any of the characteristics listed above, **including overweight**.

Primary prevention of type 2 diabetes in children should ideally include a public health approach that targets the general population. Health professionals need to be involved in developing and implementing school- and community-based programs to promote improved dietary and physical activity behaviors for all children and their families. At the com-

munity level, schools, religious organizations, youth and family organizations, and government agencies should assume some responsibility for promoting a

healthy lifestyle. Planning of effective preventative efforts for populations at-risk needs to involve members of those at-risk groups.

Source: *Diabetes Care*, 2000 Consensus Statement, Volume 23, Number 3, Pages 381-389, "Type 2 Diabetes in Children and Adolescents", American Diabetes Association.

Nutrition Guidelines for Diabetes

I. Goals of Nutrition Management

- Maintain as near-normal blood glucose as possible by balancing food intake with insulin or oral blood glucose-lowering medications and physical activity.
- Provide adequate calories for normal growth and development rates in children and adolescents.
- Prevent and treat complications of diabetes including hypoglycemia and abnormal serum lipid levels.
- Improve overall health through good nutrition.

II. Individualized Meal Planning

All people with diabetes should meet with a registered dietitian or nutrition counselor specialized in diabetes to individualize their meal plan based on their nutritional needs and usual eating habits.

- A. The calorie level of the meal plan is based on individual needs for growth and development as well as their physical activity level.

Children and adolescents, even if overweight, should not have calories restricted that could limit their normal growth and development.

- B. Spacing of food intake, particularly carbohydrate foods, throughout the day is key to blood sugar control. The *amount* and *timing* of carbohydrate

foods should be balanced with physical activity and insulin or oral medication.

- C. The type of carbohydrate is no longer restricted in the diabetic diet. For years, sugar (sucrose) was omitted and starches were preferred to natural sugars (lactose and fructose) found in milk and fruit. Scientific evidence has shown that all carbohydrates are digested and absorbed at similar rates. All carbohydrates are now counted as equal in terms of blood sugar regulation.

Carbohydrate foods are now interchanged using the amount of 15 grams for one serving of carbohydrate in a meal plan. Preference is given to whole grains, fruits, vegetables, and “low fat” milk because of their nutritional value, not because of the type of carbohydrate they contain.

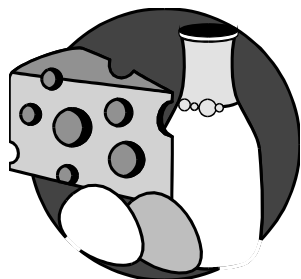
III. Nutrition Recommendations

The Dietary Guidelines for Americans provides nutrition recommendations for health and disease prevention. Nutrition recommendations for children and adolescents include:

- Aim for a healthy weight by choosing sensible portions and being physically active every day.
- Eat at least 5 servings of vegetables and fruits every day.



- Choose a variety of grain foods, especially whole grains.
- Choose plenty of calcium rich foods including milk and milk products each day.



- Choose a diet that is moderate in total fat and limited in saturated fat and cholesterol.
- Limit beverages high in sugar.
- Moderate the use of salt.
- Avoid alcoholic beverages. Alcohol may cause hypoglycemia; risk is increased if taking insulin or sulfonylureas.

IV. Meal Planning Approaches

A meal pattern provides the *framework* for making food choices. Key to all meal plans is controlling the amount and the spacing of carbohydrate foods eaten throughout the day. Carbohydrate foods include milk, starches, fruits, and other high carbohydrate foods (i.e. sweets).

- **Exchange Lists for Meal Planning** is a frequently used approach. Meal plans specify the number of servings from each food group that should be eaten at each meal and snack. Food groups list measured amounts of foods that may be exchanged for one another and provide similar calorie, carbohydrate, protein, and fat content.

Nutrition guides and exchange information for fast food restaurants and national chains are available at:

http://www.diabetes.about.com/cs/nutritiondiet/a/fast_food_guide.htm/

- **Carbohydrate counting** This approach counts only grams of carbohydrate in foods. It is used when greater simplicity and flexibility are desired. Insulin amounts may be adjusted before each meal based on the grams of carbohydrate at that particular meal.

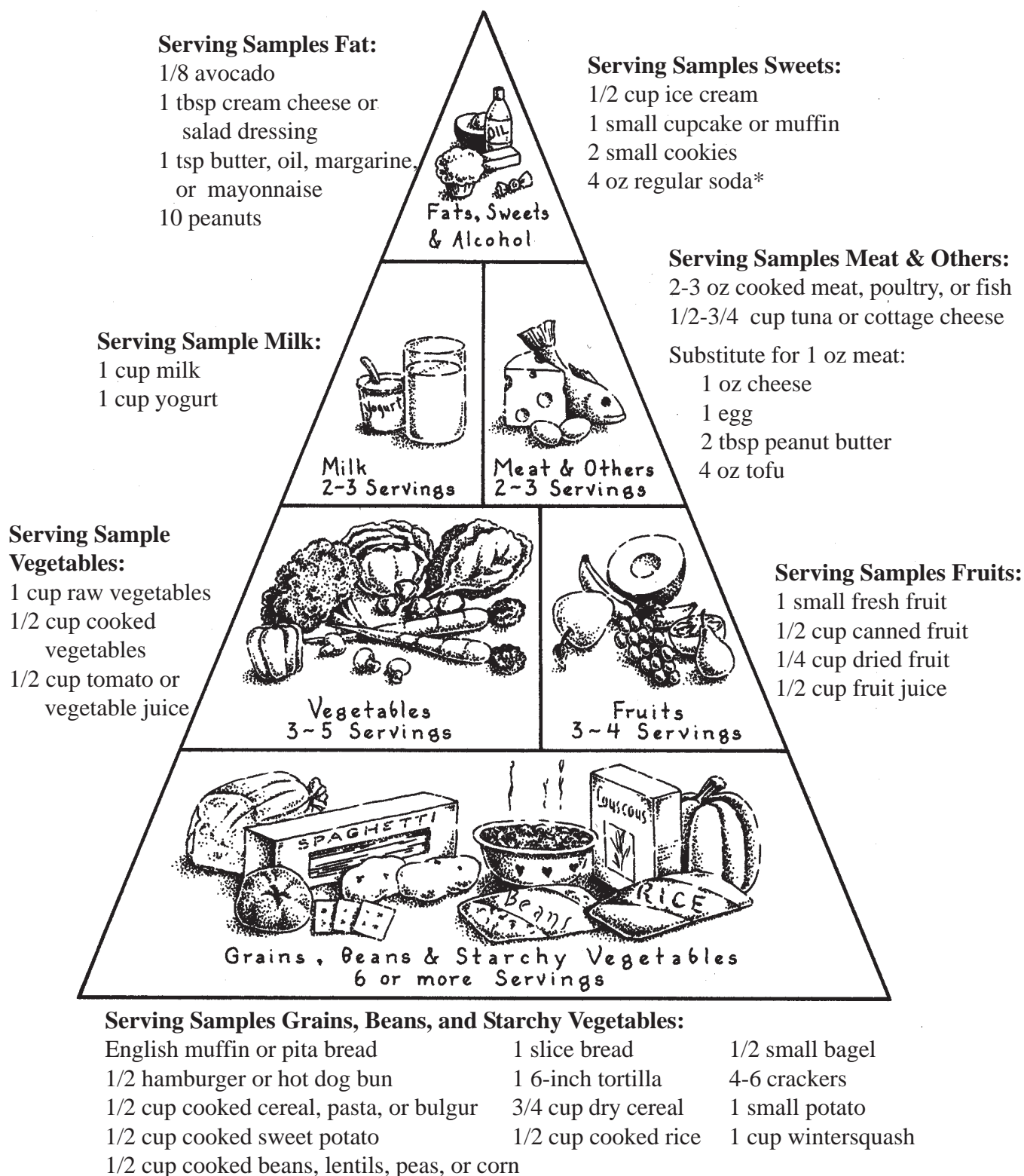
The Joslin Diabetes Center at Harvard University has created web-based materials on carbohydrate counting.

“*Carbohydrate Counting: As easy as 1-2-3*” can be accessed at:

<http://www.joslin.harvard.edu/education/library/wcarbsug.shtml/>

- **Diabetes Food Pyramid** differs from the USDA’s Food Guide Pyramid by grouping starchy vegetables and dried beans with the grain foods because of their similar carbohydrate content. See page 63 for a copy of the Diabetes Food Pyramid.

The Diabetes Food Pyramid



* The American Academy of Pediatrics discourages the use of soda in the school setting. (Soft Drinks in School. *Pediatrics*.113(1): 153 154.2004).

Classroom Snacks

Room parties and birthday celebrations frequently bring snacks into the classroom. Sugar sweetened foods, once considered “taboo” for children with diabetes, may be included with careful planning.

Carbohydrate food groups include Grains, Beans and Starchy Vegetables, Milk, Fruit, and Sweets. The type of carbohydrate you eat is not as important as once believed. It is the amount and the spacing of carbohydrates throughout the day that is key to diet control of blood sugar. Sweets may be included if substituted for other foods that contain similar amounts of carbohydrates. To help with substitutions, the amount of a food that contains approximately 15 grams of carbohydrate is considered one carbohydrate food group serving.

Help children learn to celebrate with games, contests, and adventures, instead of focusing on food as many adults do. Celebrate by offering non-food treats, such as stickers, pencils, pens, crayons, and party favors.

When sweets are served, choose ones with healthy ingredients when possible. Sweets that include whole grains and fruits, such as oatmeal raisin cookies or carrot muffins, add fiber and important nutrients.

To encourage healthy eating habits for all children, serve low sugar snacks, such as graham crackers, fruit chunks, and vegetable sticks.

Examples of Snack Substitutions are provided on pages 65-66.

Snack Substitutions

PLEASE CHECK ALL NUTRITION LABELS TO VERIFY THE AMOUNT OF CARBOHYDRATES IN EACH SERVING. If unsure, contact your food service manager.

Snack/Sweet	Serving Size	Carbohydrate Servings*
Brownie: no icing	2 “ square	1
frosted	2 “ square	2
Cake: no icing	2 “ square	1
frosted	2 “ square	2
Candy bar: snack size	1 bar (1 oz)	1
miniatures	3	1
Candy, hard	3 round pieces	1
Chips, potato or tortilla	10-15 chips (1 oz)	1
Chocolate kisses	5	1
Cookie	3 inch	1
Crackers, snack	4-5	1
Cupcake: no icing	1 small	1
frosted	1 small	2
Doughnut: plain cake	1 med (1½ oz)	1½
glazed	3 inch (2 oz)	2
Fruit: canned	½ cup	1
fresh	1 small	1
Fruit juice 100%	4 oz	1
Fruit juice bars, 100% juice	1 (3 oz)	1

*15 grams of carbohydrate = 1 carbohydrate serving

Snack Substitutions

PLEASE CHECK ALL NUTRITION LABELS TO VERIFY THE AMOUNT OF CARBOHYDRATES IN EACH SERVING. If unsure, contact your food service manager.

Snack/Sweet	Serving Size	Carbohydrate Servings*
Fruit snacks, chewy	1 roll (3/4 oz)	1
Gelatin, regular	½ cup	1
Gingersnaps	3	1
Granola bar	1 (1 oz)	1
Graham crackers	3 squares	1
Ice cream	½ cup	1
Frozen yogurt	½ cup	1
Muffin	1 small	1
Popcorn, popped	3 cups	1
Pretzels, mini twists	15 (3/4 oz)	1
Pudding: no added sugar	½ cup	1
regular	½ cup	2
Soda: regular	4 oz	1
diet	4 oz	0
Vanilla wafers	5	1
Vegetables – non starchy	3 cups raw	1
Vegetable juice	4 oz	1
Yogurt, sweetened fruit	1 cup	3

*15 grams of carbohydrate = 1 carbohydrate serving

504 Dietary Plan

Section 504 of the Rehabilitation Act of 1973 assures handicapped students access to school meal service, even if special meals are needed because of their handicap.

“Handicapped student” means any student who has a physical or mental impairment, which substantially limits one or more life activities, has a record of such an impairment, or is regarded as having such an impairment.

If special meals are needed and requested, certification from a medical doctor or health care provider must 1) verify that special meals are needed because of the handicap, and 2) prescribe the alternate foods and forms needed.

Completion of the following by a student’s physician or health care provider will provide the necessary certification:

NAME OF STUDENT FOR WHOM SPECIAL MEALS ARE REQUESTED:

<u>Food Prescribed</u>	<u>Form Allowed</u> (e.g. fresh, baked, ground, blended, etc.)
Meat & meat alternates	
Milk & milk products	
Bread & cereal	
Fruits & vegetables	
<u>Other Dietary Information and Directions</u>	

I certify the above named student is in need of special school meals prepared from the above-indicated foods and forms because of a handicap.

Physician or Health Care Provider’s Signature

Date

Source: “Diabetes Management in the School Setting”, 1998, Missouri Association of School Nurses.

- Meal Plan Sample on Back -

Meal Plan Sample

Be sure to communicate with your food service manager to confirm the nutrition content of meals.

Meal Plan (Calories) _____ Date _____

Time	Number of Exchanges/Choices	Total Carbohydrate Grams
	____ Carbohydrate group ____ Starch* ____ Fruit ____ Vegetable ____ Milk _____ ____ Meat group _____ ____ Fat group _____	
	____ _____ ____ _____	
	____ Carbohydrate group ____ Starch* ____ Fruit ____ Vegetable ____ Milk _____ ____ Meat group _____ ____ Fat group _____	
	____ _____ ____ _____	
	____ Carbohydrate group ____ Starch* ____ Fruit ____ Vegetable ____ Milk _____ ____ Meat group _____ ____ Fat group _____	
	____ _____ ____ _____	

*Starches include grains (rice, bread, pasta, etc.), beans, starchy vegetables, and foods listed as “other carbohydrates” on the diabetes exchange lists.

The Joslin Diabetes Center at Harvard University has created web-based materials on carbohydrate counting. “Carbohydrate Counting: As easy as 1-2-3” can be accessed at:
<http://www.joslin.harvard.edu/education/library/wcarbsug.shtml/>

Exercise and Diabetes

Children with diabetes should be encouraged to participate in regular physical activity. This includes participation in physical education classes, team sports, and other activities.

Benefits of exercise for the child or adolescent with diabetes include:

- Lowers blood glucose levels
- Improves cardiovascular conditioning
- Helps with weight loss or weight maintenance
- Increases flexibility, muscle strength, and endurance
- Improves self-image, overall attitude, and quality of life

Special Considerations for Children with Diabetes:

- Exercise may cause hypoglycemia (during exercise as well as up to 24 hours after exercise of long duration) so food and/or insulin may need to be adjusted.
- The child should test blood glucose before exercise and may need to test during exercise if the exercise is of long duration or high intensity, or the child exhibits symptoms of low blood glucose.
- The child should not exercise if blood glucose is <70 or >240 mg/dl and they have urine ketones.

- The child may exercise if low blood sugar is treated successfully.
- The child may exercise if their blood glucose is >240 mg/dl and they DO NOT have urine ketones.
- The child should carry or have easy access to a food or fluid containing simple sugar (e.g. glucose tabs).
- The child should always wear diabetes identification in a visible location.



Additional Food for Activity

The blood sugar should be checked according to the student's Individualized Health Plan and proper measures should be taken to keep the level in the appropriate range. The following chart illustrates actions that **might** be recommended by the students' health care provider to maintain a safe blood sugar during physical activity

Type of Activity	If Blood Sugar prior to activity is:	Then eat the following before activity:
Light Intensity or Short Duration (Examples: walking, leisurely biking - activity lasting less than 30 minutes)	<100	15 gm of carbohydrate
	>100	No extra food needed
Moderate Intensity and Duration (Examples: tennis, jogging, golfing, - activity lasting 30 minutes to an hour)	<100	25-50 gm of carbohydrate before exercise
	100-180	15 gm of carbohydrate
	180-240*	No extra food needed
Strenuous Activity (Examples: hockey, basketball, swimming, soccer, roller blading – activity lasting 60 minutes or more)	<100	50 gm of carbohydrate
	100-180	25-50 gm of carbohydrate
	180-240*	15 gm of carbohydrate

*If blood sugar is >240, check for the presence of ketones in the urine. For more details on ketones, see page 92.

Snack Suggestions		
15 grams Carbohydrate: 1-4 oz juice box 1 cup Gatorade 1 apple or orange 1 small box raisins 6 saltine crackers 1 cup light yogurt ¾ cup dry unsweetened cereal 1 slice bread	30 grams Carbohydrate: 1 cereal bar 1-8 oz juice box 2 slices bread 1 small bagel	45-50 grams carbohydrate: 1 cup Gatorade plus 1 cereal bar 1 medium banana plus one small bagel

Adapted from: Department of Health and Senior Services, *Missouri Diet Manual*, 9th Edition, 2003. "Diabetes in Children A Resource Guide for School Personnel", 2002, Illinois Department of Human Services.

<http://www.iasn.org/diabetes.pdf>

Exercise Safety Tips

Because exercise affects the way glucose (sugar) is used in your body, people with diabetes who take insulin need to take some precautions when they exercise. These safety measures will help to prevent low blood sugar reactions.

Guidelines to follow during exercise:

1. PE classes should ideally be scheduled after a meal (Breakfast or Lunch) to prevent low blood sugar.
2. **DO NOT** exercise when blood sugar levels are low, unless treated successfully.
3. **DO NOT** exercise if your blood sugar is >240 mg/dl and you have ketones. If you have a blood sugar >240 mg/dl but **DO NOT** have ketones, exercise with caution.
4. Watch for signs of low blood sugar during exercise. If you feel them, **STOP** the activity, **EAT** some fast-acting sugar, and **TELL** an adult.
5. To decrease the chances of having a low blood sugar, it is best to exercise $\frac{1}{2}$ to 1 hour after a meal or snack.
6. It is important to drink lots of fluids, especially water, during long periods of exercise.
7. Avoid giving insulin into muscles you will be using during exercise to prevent the insulin from working too fast. This will help reduce the chance of a low blood sugar reaction.
8. It is also important to eat enough carbohydrates during the hours after exercise to prevent low blood sugar reactions later on.
NOTE: The effect of exercise may last up to 24 hours after exercise and varies from person to person.
9. Carry some simple sugar with you in case of a low blood sugar.
10. Always wear diabetes identification in a visible location.

- | | |
|--|--|
| <ul style="list-style-type: none">11. It is best to exercise with at least one other person.12. Be sure to tell friends, coaches, teachers, and/or other people of the possibility of low blood sugar during exercise.13. Be sure to instruct others about recognizing and treating low blood sugar. | <ul style="list-style-type: none">14. Wear the right shoes and clothing for the weather and type of exercise you are doing.15. Take care of any injuries immediately, especially foot injuries. |
|--|--|
-

Adapted from: “Diabetes Management in the School Setting”, 1998, Missouri Association of School Nurses.

Insulin Action Times

There are three characteristics of insulin. These are:

Onset – the length of time before insulin reaches the bloodstream and begins lowering blood sugar.

Peak Time – The time during which insulin is at its maximum strength in terms of lowering blood sugar levels.

Duration – How long the insulin continues to lower blood sugar.

Storage and expiration dates also need to be taken into consideration.

Storage - Opened vials may be left at room temperature for 28-30 days after opening, or as indicated on package. Avoid exposure to extreme temperatures. Unopened vials should be stored in the refrigerator and are good until the expiration date on the package.

NOTE: Lantus must be refrigerated at all times, whether vials are opened or unopened.

Expiration Date - Make sure that the insulin that is supplied will be used before its expiration date.

Below you will find a table describing the insulin types with their comparative action times.

Types of Insulin by Comparative Action

Animal or Human	Insulin Type	Onset	Peak (Hours)	Usual Effective Duration (Hours)	Usual Maximum Duration (Hours)
Animal	regular	0.5 – 2 hours	3 – 4	4 – 6	6 – 8
	NPH	4 – 6 hours	8 – 14	16 – 20	20 – 24
Human	insulin aspart	5 – 10 minutes	1 – 3	3 – 5	4 – 6
	insulin lispro	< 15 minutes	.5 – 1.5	2 – 4	4 – 6
	regular	0.5 – 1 hour	2 – 3	3 – 6	6 – 10
	NPH	2 – 4 hours	4 – 10	10 – 16	14 – 18
	lente	3 – 4 hours	4 – 12	12 – 18	16 – 20
	ultralente	6 – 10 hours	---	18 – 20	20 – 24
	insulin glargine	1.1 hours	---	24	24

Please Note: Types of insulin are listed in more detail in the Reference Section at the back of this manual.

Adapted from: *Diabetes Forecast*, 2004 Resource Guide, Volume 57, Number 1, Pages RG 16-17. "Diabetes in Children A Resource Guide for School Personnel", 2002, Illinois Department of Human Services. <http://www.iasn.org/diabetes.pdf>.



Disposing of Sharps Safely

Millions of individuals with serious health conditions manage their care at home. For example, people with diabetes use syringes and lancets to test their blood sugar every day. All this creates a lot of medical waste. What's the best way to handle this waste?

The best way to protect trash handlers and sewage treatment workers against disease and injury, and avoid attracting drug abusers looking for syringes to reuse, is to follow these guidelines for containment and disposal of sharps.

Containment

- Contain the sharps in your own home.
- Use a puncture-proof plastic container with tight-fitting screw top. A bleach bottle is good. Don't use glass because it can break. Coffee cans are not recommended because the plastic lids come off too easily. A red sharps container may be purchased at local pharmacies as well.
- Label the container clearly. Write "Contains Sharps" with a waterproof marker directly on the container or on masking tape on the container.
- Once a syringe or lancet is used, immediately put it into a container. Screw on the top. Don't clip, bend or recap the needles because of potential injury to yourself.

- Keep the container away from children!
- When the container is full, screw on the cap tightly. Seal it with heavy-duty tape to be extra safe.

Disposal

There are different options for getting rid of the container of sharps. Some cities and towns have more options than others do. Here are the best ways for safety, health, and protection of the environment.

- Call local doctors, pharmacies, clinics, local hospitals, or nursing homes and ask if they accept properly contained sharps for disposal. Ask local diabetes educators or local American Diabetes Association office about sharps disposal programs.
- Call local public works department or solid waste manager. (Check the blue pages of the telephone book for their numbers.) Some communities have special household medical waste collection or drop-off days.
- Call local health departments and ask about special household medical waste disposal programs.

Consult your local department of public works for information about laws applying to disposal of household sharps along with household trash.

Oral Agents for Type 2 Diabetes

Drug Class	Generic Name	Trade Name	When to take	Usual Dosage	Max. Dosage	Peak	Duration	Side Effects
Alpha-Glucosidase	Slows down carbohydrate absorption in intestines							
	Acarbose	Precose	With first bite of food	25mg 3 X day	100 mg 3 X day	1 hr.	2-4 hr.	Abd. Pain Diarrhea Flatulence
	Miglitol	Glyset	With first bite of food	25 mg 3 X day	100 mg 3 X day	2-3 hr.	Unknown	Same as above
Biguanides	Decreases hepatic glucose production							
	Metformin	Glucophage	With Meals	500 mg 3 X day	850 mg 3 X day	UNK	Unknown	Diarrhea Nausea/vomiting Metallic Taste in Mouth
	Meformin (long acting)	Glucophage XR	With Meal	500 mg daily	2000 mg daily	UNK	Unknown	Same as Above
Meglitinides	Stimulates insulin release from pancreas							
	Nateglinide	Starlix	10 min. before meals	120 mg 3 X day	None given	1-2 hr.	4 hrs.	Gastric Upset Rash Upper Resp. Inf.
Sulfonylureas	Stimulates insulin release from pancreas							
	Repaglinide	Prandin	30 mins. Before meals	0.5 mg 2-4 X daily	4 mg 2-4 X daily	1 hr.	Unknown	Ischemia
	Acetohexamide	NONE listed	Before meals	250 mg daily	1500 mg daily	3 hr.	12-24 hr.	Ischemia
	Chlorpropamide	Diabinese	With Breakfast	250 mg daily	750 mg daily	2-4 hr.	24 hr.	Leukopenia
	Glimepiride	Amaryl	With first Meal	1-2 mg daily	8 mg daily	2-3 hr.	> 24hr.	Same as Above
	Glipizide	Glucotrol	Before Breakfast	5 mg daily	15 mg daily	1-3 hr.	4 hr.	Same as Above

(continued on page 88a)

(continued from page 88)

Drug Class	Generic Name	Trade Name	When to take	Usual Dosage	Max. Dosage	Peak	Duration	Side Effects
Sulfonylureas - continued	Glipizide (long acting)	Glucotrol XL	Before Breakfast	5 mg daily	20 mg daily	6-12 hr.	24 hr.	Same as Above
	Glyburide	DiaBeta, Micronase	With Breakfast	1.25 mg daily	20 mg daily	4 hr.	24 hr.	Same as Above
	Glyburide (micronized)	Glynase Pres Tab	With Breakfast	0.75 mg daily	12 mg daily	4 hr.	24 hr.	Same as Above
	Tolazamide	Tolinase	With Breakfast	100 mg daily	1000 mg daily	4-6 hr.	14-16 hr.	Same as Above
	Tolbutamide	Orinase	Take in Morning	1 gram daily	3 grams daily	1 hr.	5-8 hr.	Same as Above
Thiazolidinediones (TZDs)	Improves peripheral insulin sensitivity							
	Pioglitazone	Actos	Once Daily	15 mg daily	30 mg daily	2 hr.	Unknown	Headache Edema Anorexia
	Rosiglitazone	Avandia	Take in Morning	4 mg daily	8 mg daily	1 hr.	Unknown	Same as Above
Combination Pills								
	Metformin + Glyburide	Glucovance	With Meals	1.25/250 mg. daily	20/2000 mg daily	2 weeks	Unknown	Headache Dizziness
	Metformin + rosiglitazone	Avandamet	With Meals	1/500 mg daily	8/2000 mg daily	1 hr.	Unknown	Headache Diarrhea
	Metformin + Glipizide	Metaglip	With Meals	2.5/250 mg daily	5/500 mg daily	UNK	Unknown	Headache Diarrhea Hypertension Dizziness N & V

Adapted from: *Diabetes Forecast*, 2004 Resource Guide, Volume 57, Number 1, Page RG 13.

Monitoring Glucose Control

I. Self-Monitoring of Blood Glucose (SMBG)

A. *Critical element in management of diabetes*

B. *Note for comparing plasma, whole-blood (capillary), and venous glucose:*

Serum and plasma glucose levels measured in most clinical labs can be 10-15% higher than whole-blood levels measured by some home monitoring equipment.

C. *Methods*

Blood glucose meter: usually performed by placing droplet of whole blood on reagent strip. Meter then provides a digital glucose reading. Meters available in wide variety of models and price ranges. Results may be influenced by hematocrit, altitude, temperature, and use of oxygen.

II. Frequency of Testing

A. *Determining factors*

1. Type of diabetes
2. Levels of control preferred
3. Ability to perform test independently
4. Affordability
5. Willingness to test (i.e., at school, work, etc.)

B. *General Guidelines*

1. Type 1: four times/day before meals and bedtime
2. Type 2: as needed to achieve glycemic goals

3. Gestational Diabetes (GDM): fasting and 1-2 hours after meals
4. Physical activity: before and after to determine effect on metabolic control (in type 1 and type 2 if needed)
5. Hypoglycemia: determine presence of hypoglycemia and response to treatment
6. Illness: every 4-6 hours
7. Insulin pump or intensive management: four or more times/day

III. Normal and Target Plasma Blood Glucose Levels (mg/dl)*

Biochemical Index	Normal	Goal	Additional Action Suggested
Average preprandial glucose (mg/dl) [†]	70-110	90-130	<90
Average postprandial glucose (mg/dl) [†]	70-140	<180	
A1C (%)	<6	<7	>8

*The values shown in this table are by necessity generalized to the entire population of individuals with diabetes. Patients with co-morbid disease, the very young, older adults, and others with unusual conditions or circumstances may warrant different treatment goals. These values are for nonpregnant adults. "Additional action suggested" depends on individual patient circumstances. Such actions may include enhanced diabetes self-management education, co-management with a diabetes team, referral to an endocrinologist, change in pharmacological therapy, initiation of or increase in SMBG, or more frequent contact with the patient. A1C is referenced to a nondiabetic range of 4.0-6.0% (mean 5.0%, SD 0.5%).

[†] Measurements of capillary blood glucose.

IV. Glycated Hemoglobin (A1C)

- A. Indicates blood glucose control over a period of approximately 3 months.
- B. Normal range varies depending on method lab uses; usually 4-7%, correlating to average blood glucose of 60-150mg/dl (-3.3-8.3 mmol/l).
- C. Should be ordered by health care provider every 3 months for type 1 diabetes and 3-6 months for type 2 to help determine overall control.
- D. Patient does not need to be fasting to have this blood test performed.

V. Fructosamine Test (Glycated Serum Protein [GSP])

- A. Reflects blood glucose control over preceding 7-10 days.
- B. May be used as a means of monitoring women during pregnancy, when more frequent determinations of control are essential.

VI. Urine Ketone Testing

- A. Ketones: by-product of fat metabolism; presence indicates body is not metabolizing food properly because of lack of available insulin or carbohydrate; may indicate impending or established diabetic ketoacidosis (DKA), a condition that requires immediate medical attention.
- B. Method: Ketone strips
 - 1. Strips are read by comparing the test color to a standard color chart.

- 2. Factors such as handling the color pad with your hands or placing test materials on a counter recently cleaned with bleach can cause inaccurate results
- 3. Be aware of expiration dates; the strips are good only for a specified time, usually 3-6 months. When a bottle of strips is opened, date it and note expiration date.

C. When to Test

- 1. When blood glucose level is consistently >240mg/dl (13.3 mmol/l)
- 2. Before exercise. Do not exercise if blood glucose is >240 mg/dl and ketones are present.
- 3. During periods of acute illness (illness is a stress that can cause hyperglycemia)
- 4. When symptoms of hyperglycemia accompanied by nausea, vomiting, and abdominal pain are present.

Here are additional resources you might find useful:

- “Diabetes in Children A Resource Guide for School Personnel”, 2002, Illinois Department of Human Services.
<http://www.iasn.org/diabetes.pdf>
- National Institutes of Diabetes and Digestive and Kidney Diseases (NIDDK), Hypoglycemia:
<http://www.diabetes.niddk.nih.gov/dm/pubs/hypoglycemia>

Adapted from: Ballard AM, 2000. *Monitoring Glucose Control*. The Diabetes Ready-Reference Guide for Health Care Professionals. American Diabetes Association. ©

Recommended Guidelines for Blood Glucose Control

Students with diabetes need to obtain a blood glucose level and to respond to the results as quickly and conveniently as possible. This is important to avoid medical problems being worsened by a delay in testing/treatment and to minimize educational problems caused by missing instructions in the classroom.

To maximize instructional time, a student should be allowed to check his or her blood glucose level and take appropriate action to treat hypoglycemia. This applies to the classroom or anywhere the student is in conjunction with a school activity, if preferred by the student and indicated in the student's Individualized Health Plan. However, some students prefer to test their blood glucose in private and their privacy should be respected.*

See the table below for Recommended Guidelines for Blood Glucose Control. Blood glucose values less than 90 are considered low and should be monitored. When you schedule appointments with your physicians or your dietitian, remember to bring a logbook containing two weeks of blood glucose values to each appointment.

The "Take Action" column implies a possible insulin or food adjustment. We recommend keeping a log of three to five days of blood glucose values to identify a pattern of consistent high blood glucose before calling for an insulin adjustment. If blood glucose is consistently low, call for an insulin adjustment.

Dietitians recommend reviewing food intake and carbohydrate counting skills to make sure inconsistent eating is not the cause of varying blood glucose values. Checking food portions with measuring cups is helpful.

Remember, unless you are on Multiple Daily Injections (three shots per day) or an Insulin Pump, you should have a consistent carbohydrate meal plan to follow.

Summer exercise and activities may also influence blood glucose. A rule of thumb is to take one extra carbohydrate (15 grams) for each 30-45 minutes of more strenuous activity in addition to the current meal plan.

* Source: "Diabetes Care in the School and Day Care Setting". *Diabetes Care*, Volume 27, Supplement 1, Pages S122-S128, January 2004.

Recommended Guidelines for Blood Glucose Control				
NOTE: Ranges may vary according to individual needs				
Plasma Monitor Values			Whole Blood Monitor Values	
When	Goal BG	Take Action: If BGs are out of range 2-3 days in a row	Goal BG	Take Action: If BGs are out of range 2-3 days in a row
Before meals (Kids 5 years and older)	90-130	Less than 90 or greater than 150	80-120	Less than 80 or greater than 140
Kids under 5 years	100-200	Less than 100 or greater than 200	100-200	Less than 100 or greater than 200
2 hrs after meals (MDI or Pumps)	Within 40 of premeal BG but less than 180	If less than or greater than 40 of premeal BG	Within 40 of premeal BG but less than 180	Less than or greater than 40 of premeal BG

Adapted from: "Shot Talk" produced by Children's Mercy Hospital & Clinics, The Children's Diabetes Center – Summer, 2001

Proper interpretations of A1C test results requires that health care providers understand the relationship between test results and average blood glucose, kinetics of the A1C test, and specific assay limitations. Data from the Diabetes Control and Complications Trial (DCCT) relating A1C test results to mean plasma glucose levels appear in Table 1, but this data should be used with caution if the A1C test assay method is not certified as traceable to the DCCT reference method.

Table 1. Correlation Between A1C Level and Mean Plasma Glucose Levels		
A1C (%)	Mean Plasma Glucose	
	mg/dl	mmol/l
6	135	7.5
7	170	9.5
8	205	11.5
9	240	13.5
10	275	15.5
11	310	17.5
12	345	19.5

Source: American Diabetes Association, Diabetes Care, Volume 26, Supplement 1, January 2003.

Blood Glucose Monitors

Below is a list of Blood Glucose Monitors. For a complete list of Blood Glucose Monitors and Data Management Systems, please visit the American Diabetes Association's 2004 Resource Guide at: <http://www.diabetes.org/uedocuments/monitors-tables.pdf>

Plasma Meters		
Accu-Check Active	BD latitude Diabetes	Presitge IQ
Accu-Check Advantage	BD Logic	Presige LX
Accu-Check Compact	FreeStyle	Precision Sof-Tact
Accu-Check Complete	FreeStyle Flash	Precision Xtra
Accu-Check Voicemate	FreeStyle Tracker	QuickTek
Ascensia Breeze System	Hypoguard Advance	Supreme II
Ascensia DEX 2	OneTouch InDuo	TrueTrack Smart System
Ascensia Elite	OneTouch SureStep	
Ascensia Elite XL	OneTouch Ultra	
Assure	OneTouch UltraSmart	
Assure II	Focus Blood Glucose Monitoring System	

Whole Blood Meters			
One Touch Profile	One Touch Basic	One Touch II	ReliOn

Adapted from: *Diabetes Forecast*, 2004 Resource Guide, Volume 57, Number 1, Pages RG 40-47.

Treatment of Low Blood Sugars

1. A low blood sugar level is an **emergency that needs to be treated immediately**. Without treatment, a low blood sugar may progress to unconsciousness and convulsions.
2. Low blood sugars can be prevented by:
 - **Extra** snacks for extra activity (consult exercise guide and/or dietitian)
 - Eating immediately after taking insulin if the blood sugar is <100 mg/dl
 - Eating an **extra snack** of carbohydrate and protein if the blood sugar is <120 mg/dl at bedtime
3. Treatment should be given whenever the blood sugar drops below 90 mg/dl or symptoms are present.
4. Notify parent or guardian when treatment is necessary due to low blood sugar.

SYMPTOMS	TREATMENT
MILD Irritability Shakiness Sweating Fast heart rate Pale skin Dizziness Hunger	QUICK-ACTING SUGAR <ul style="list-style-type: none"> • 15 grams of carbohydrate • See treatment guide by age on page 97. • If not better in 15 minutes, repeat treatment. • If the next meal or snack is more than 30 minutes away, give an extra snack of carbohydrate and protein.
MODERATE Confusion Poor coordination Behavior change Slurred speech Weakness Headache	INSTANT GLUCOSE/CAKE FROSTING (GEL) <ul style="list-style-type: none"> • Insert tube between gum and cheek. • Administer appropriate amount. • If no response in 15 minutes, administer glucagon. • If the next meal or snack is more than 30 minutes away, give an extra snack of carbohydrate and protein.
SEVERE Unconsciousness Seizures Inability to swallow	GLUCAGON <ul style="list-style-type: none"> • Administer Glucagon as directed. • Call paramedics. • Phone diabetes doctor on call. • Feed as soon as possible after awakening.

Adapted from: "Diabetes Management in the School Setting", 1998, Missouri Association of School Nurses.

Carbohydrates for Treatment of Low Blood Sugar Management

- The following table contains correct amounts of carbohydrate for treating low blood sugar in children. Amounts will vary according to age.
- Chocolate candy bars should NOT be used in the treatment of low blood sugar because they are high in fat content. Fat causes digestion to be slower so that sugar does not enter the cells as fast as other choices.
- Low fat or 2% milk is a good choice (especially during the night if the next meal is more than about 30 minutes away) because it also contains protein and some fat which will help keep the blood sugar in target range.
- If the next meal or snack is more than 30 minutes away, the fast-acting sugar should be followed by an extra snack consisting of a bread and a meat.

ITEM	5 YEARS OF AGE AND YOUNGER (5-10 grams)	6-10 YEARS OF AGE (10-15 grams)	10 YEARS OF AGE AND OLDER (15-20 grams)
B-D Glucose Tablets (large) (3 tabs = 15 grams)	1-2 tablets	2-3 tablets	3-4 tablets
Dextrotabs, Dextrasol Tabs (small) (7 tabs = 15 grams)	3-4 tablets	5-6 tablets	7-8 tablets
Glucose Gel (31 gram tube)	1/6-1/3 tube	1/3-1/2 tube	1/2-2/3 tube
Cake icing (small tube) (1 teaspoon = 4 grams)	2 teaspoons	3 teaspoons	4-5 teaspoons
Honey, maple or Karo Syrup (1 teaspoon = 5 grams)	1-2 teaspoons	2-3 teaspoons	3-4 teaspoons
Orange Juice (1/3 cup = 10 grams)	1/4 -1/2 cup	1/2 -3/4 cup	3/4-1 cup
Apple Juice (1/3 cup = 10 grams)	1/4 -1/2 cup	1/2 -3/4 cup	3/4 -1 cup
Table Sugar (1 teaspoon = 4 grams)	2 teaspoons	3 teaspoons	4-5 teaspoons
Regular Soda (1 ounce = 3 grams)	2-3 ounces	4-5 ounces	5-6 ounces
Raisins (1 tbsp = 7 ½ grams)	1 tablespoon	1 1/2 -2 tablespoons	2 1/2 -3 tablespoons
Lifesavers (1 = 3 grams)	2-3	4-5	5-7
Milk-2% (8 ounces = 12 grams)	4-5 ounces	6-7 ounces	8-10 ounces

What is Glucagon?

Glucagon is used to raise the blood sugar when a child is unable to take liquid or food by mouth because of severe sleepiness, unconsciousness, or seizure activity. Glucagon must be injected with a syringe into the skin, like insulin. It is a hormone, which helps the liver to release sugar to raise the blood sugar.

When Do You Use Glucagon?

When the child has low blood sugar (usually below 20mg/dl) and is unable to take liquid or food by mouth because of severe sleepiness, unconsciousness, or seizure activity.

What You Need

- 2 Glucagon Emergency Kits. You will need a prescription to purchase the kits at a pharmacy. It is recommended you have one for home and one for school.
- Use of glucagon should be part of a child's Individualized Health Plan and be supplied to the school by the family with accompanying physician order.

When Possible, Check Blood Sugar Before and/or After Giving Glucagon. To Inject Glucagon:

- Glucagon is now available as recombinant DNA in a kit containing the glucagon powder in a vial and the diluent in a glucagon syringe.
- Remove the seal from the bottle of glucagon in the kit (the small vial/bottle containing a white powder/pellet).
- Inject the liquid in the syringe into the bottle of glucagon.

- Remove syringe from the bottle of glucagon, shake the bottle gently until the glucagon dissolves (looks clear).
- Draw-up the solution in the bottle with the correct size syringe based on the weight of the child.
- The glucagon syringe is marked with only 2 dosages 0.5 mg and 1.0 mg. The recommended dose of glucagon to inject is*:
 - –0.5 mg for a child 50 pounds or under
 - 1.0 mg for a child over 50 pounds
- Inject glucagon in the same manner as insulin injections.
- Keep the child lying on their side in case of vomiting.
- If the child does not respond, call 911.
- Once the child is awake give a snack such as cheese and crackers.

NOTE: It is common for the child to vomit or feel nauseous after receiving glucagon. Keep glucagon at room temperature in a central location in the home. Inform other caregivers of the location.

When possible, practice drawing up glucagon with an expired kit. Check the date of glucagon kits on a regular basis. Discard if past the expiration date. Obtain a refill immediately.

**dosage recommendations from glucagon manufacturer*

Adapted from: "Children with Diabetes: A Resource Guide for Schools", 2001, New York State Department of Health

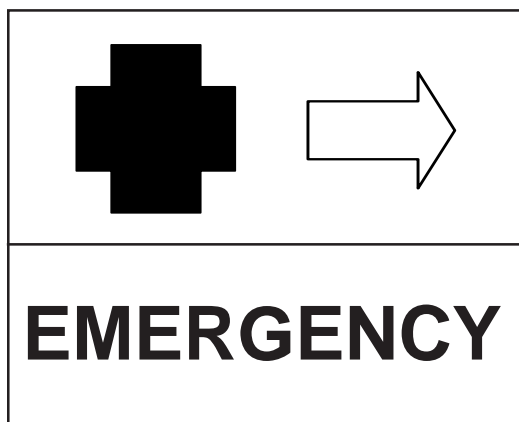
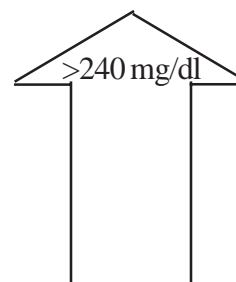
Treatment of High Blood Sugars

These are only recommendations. Follow orders as prescribed by the student's physician.

1. If the blood sugar level is >240 mg/dl, check urine ketones regardless of how the child feels.

2. If **URINE KETONES** are negative to small:

- * Have the child drink 8-12 ounces/hour of caffeine-free, sugar-free, noncaloric fluids such as water, diet soda
- * Recheck blood glucose and urine for ketones in 2-3 hours
- * Repeat above as needed



3. If **URINE KETONES** are moderate to large, call for help immediately

- * This may mean the child needs extra insulin **NOW**
- * **Call parent or guardian immediately.**
- * **If parent or guardian cannot be reached and student is vomiting and unable to take fluids by mouth, call emergency personnel for transport to the emergency room.**

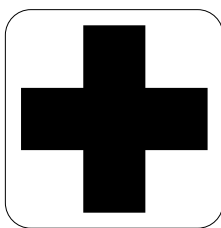
NOTE: The school health nurse or personnel should review the Emergency Action Plan to determine what the school and parent(s)/guardian(s) had agreed upon as the first step when dealing with the situation once ketones have been detected. If the Emergency Action Plan identifies the child is to be given insulin immediately, then do so; otherwise, follow the steps on the Emergency Action Plan.

Symptoms of high blood sugar may include:

- Lack of appetite
- Blurred vision
- Difficulty in breathing
- Fruity odor of breath or urine
- Dry mouth
- Mental sluggishness, slowness to respond
- Nausea, vomiting, stomach pain
- Dry or flushed skin
- Weakness
- Intense thirst
- Frequent urination

Adapted from: "Diabetes Management in the School Setting", 1998, Missouri Association of School Nurses, "Diabetes in Children A Resource Guide for School Personnel", 2002, Illinois Department of Human Services, <http://www.iasn.org/diabets.pdf>.

(Sample #2)



Health Services Department Emergency Plan DIABETES

In an emergency:

- 1) Stay with child.
- 2) Call / ask someone to call school _____ who will assess child and summon EMS if needed.

<u>IF YOU SEE THIS:</u>	<u>DO THIS:</u>
(Based on this child's current condition, a Medical Emergency for this child is:)	
IF student is not responsive (unconscious, having seizures, or is unable to swallow)	<ul style="list-style-type: none">• CALL 911...Call Parents/Guardians• Don't attempt to give anything by mouth.• Position on side, if possible.• Contact school nurse or trained diabetes personnel.• Administer glucagon, as prescribed.• Stay with student.
IF student is non-responsive, but able to swallow	<ul style="list-style-type: none">• Squirt _____ inside cheek closest to ground.• _____ is kept in _____.• Measure Blood Sugar with monitor (to be done by _____).
IF student is responsive	<ul style="list-style-type: none">• Hypoglycemic (low blood sugar) reaction: IF Blood Sugar reading is _____ or below, then give _____.• Hyperglycemia (high blood sugar) reaction: Keep student walking or sitting and drinking water.• If Blood Sugar is > _____ mg/dl, student, school nurse or assigned person (identify: _____) should check urine for ketones.

IMPORTANT EMERGENCY NUMBERS:

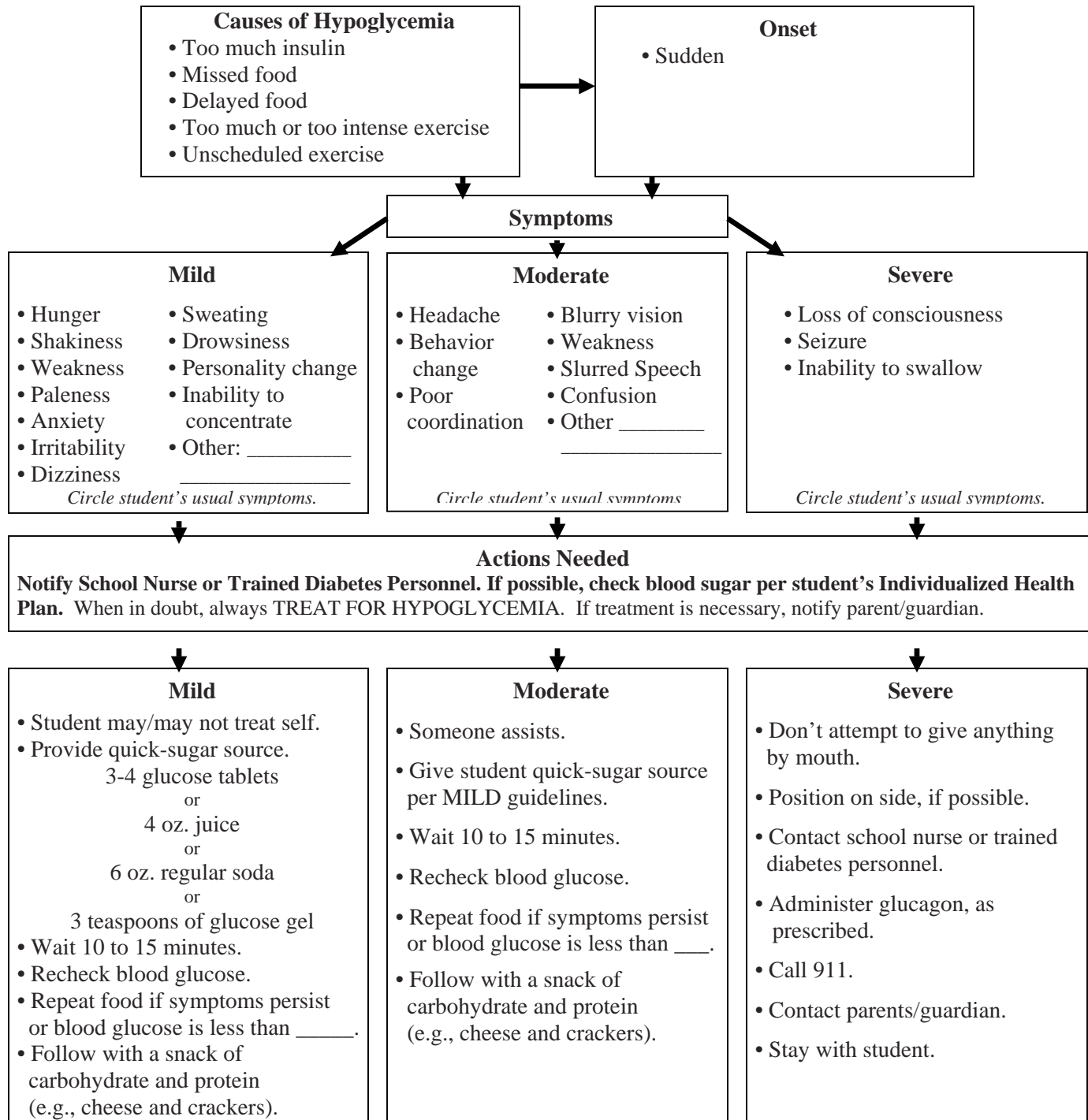
_____	_____
_____	_____
_____	_____

Adapted from: "Diabetes Management in the School Setting", 1998, Missouri Association of School Nurses.
Sample from Lee's Summit School District.

Hypoglycemia (Low Blood Sugar)

Quick Reference Emergency Planning Tool

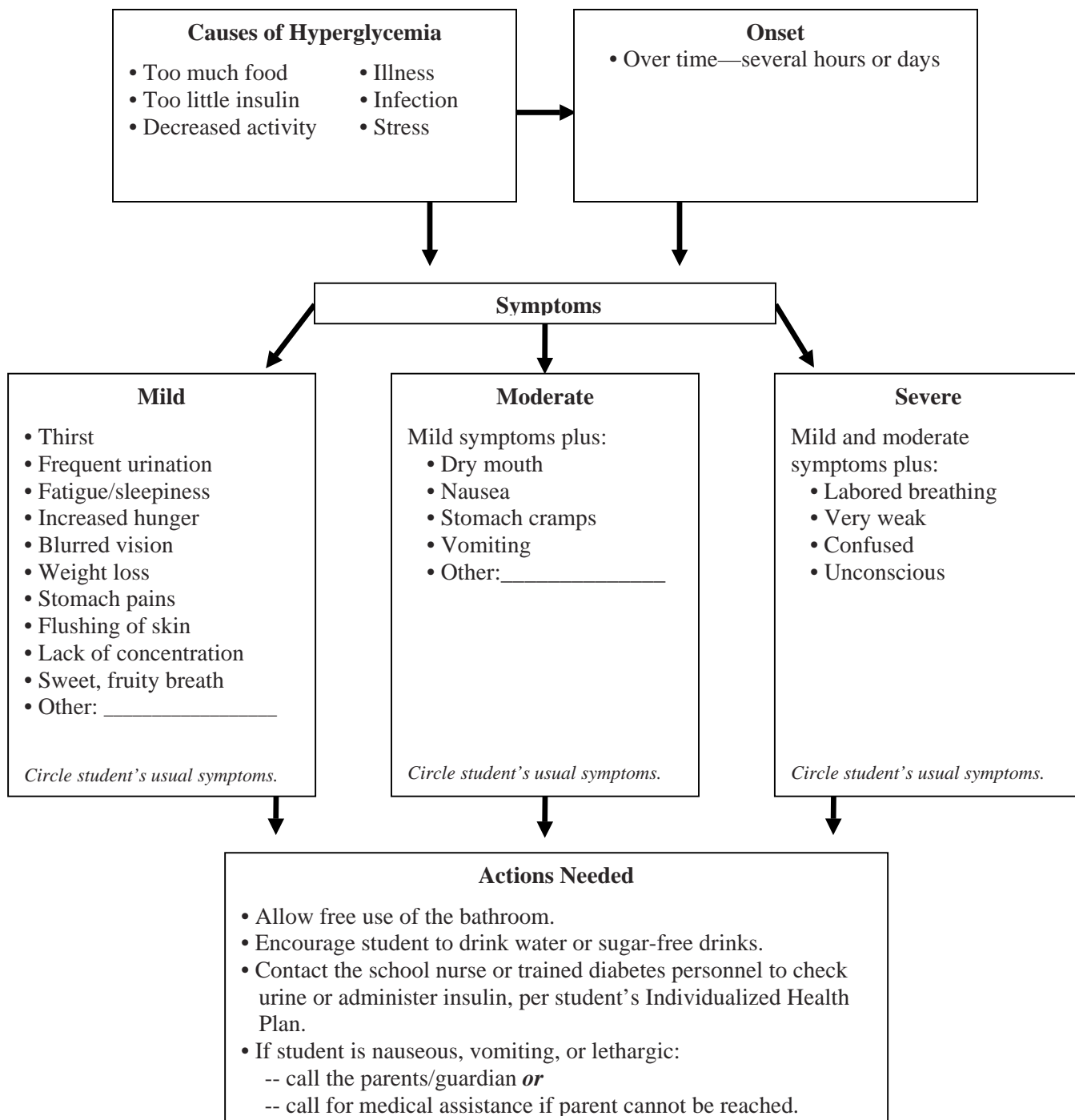
Never send a child with suspected low blood sugar anywhere alone.



Adapted from: *Helping the Student with Diabetes Succeed: A Guide for School Personnel*, June 2003, Page 53.
National Diabetes Education Program. http://www.ndep.nih.gov/diabetes/pubs/Youth_SchoolGuide.pdf

Hyperglycemia (High Blood Sugar)

Quick Reference Emergency Planning Tool



Adapted from: *Helping the Student with Diabetes Succeed: A Guide for School Personnel*, June 2003, Page 54.
National Diabetes Education Program. http://www.ndep.nih.gov/diabetes/pubs/Youth_SchoolGuide.pdf

Local and National Resources

The American Diabetes Association (ADA) is the leading nonprofit health organization providing diabetes research, information, and advocacy. Their resources include:

Wizdom Kit for children who are newly diagnosed with diabetes
<http://www.diabetes.org/wizdom/index.shtml>

“Diabetes Care Tasks at School: What Key Personnel Need to Know” Curriculum
<http://www.diabetes.org/schooltraining/>

Education Recognition Programs
<http://www.diabetes.org/education/eduprogram.asp>

Resource Guide
<http://www.diabetes.org/uedocuments/monitors-tables.pdf>

For general information about diabetes, or to locate the office nearest you, call 1-888-DIABETES (342-2383) or visit their website at:

<http://www.diabetes.org>.

ADA – Springfield Area
1944-A E Sunshine
Springfield, MO 65804
(417) 890-8400

ADA – Joplin
P.O. Box 4995
Joplin, MO 64802
(417) 624-8455

ADA – Mid-Missouri
PO Box 1013
Columbia, MO 65205-1013
(573) 443-8611

ADA – Kansas City Area
10580 Barkley, Ste 400
Overland Park, KS 66202
(913) 383-8210

ADA – St Louis Area
10820 Sunset Office Dr, Ste 220
St Louis, MO 63127
(314) 822-5490

Newly diagnosed families can turn to the Juvenile Diabetes Research Foundation (JDRF) for valuable information on how to deal with their child's illness. JDRF offers a "Bag of Hope" for parents with children who are newly diagnosed with diabetes. For more information contact the office nearest you or visit their website at: <http://www.jdrf.org>

JDRF – Metro St Louis/Greater Missouri Chapter
225 S Meramec, Suite 400
St Louis, MO 63105
(314) 726-6778

JDRF – Kansas City Chapter
6701 West 64th Street, Suite 319
Shawnee Mission, KS 66202
(913) 831-7997

The Starbright Foundation is dedicated to the creation and distribution of programs that empower seriously ill children and teens to address the challenges that accompany prolonged illness.
<http://www.starbright.org/>

Diabetes Educators provide valuable services to those who have diabetes. To locate a Certified Diabetes Educator within your area, go to the American Association of Diabetes Educators web site at:
<http://www.aadenet.org/FindAnEduc/index.html>.

Central Missouri Association of Diabetes Educators
(573) 632-5310

Kansas City Regional Association of Diabetes Educators
(913) 631-3840 or
(913) 676-2495

St Louis Association of Diabetes Educators
(314) 644-6575

Children With Diabetes
http://www.childrenwithdiabetes.com/index_cwd.htm

Nutrition is a key in managing diabetes. To locate a registered dietitian near you, use the American Dietetic Association's web-tool "*Find a Nutrition Professional*" at http://www.eatright.org/Public/index_7684.cfm

or contact:

Missouri Dietetic Association
PO Box 1225
101 E. High St, Ste 200
Jefferson City, MO 65102-1225
(573) 636-2822
<http://www.eatrightmissouri.org>

The American Dietetic Association also has various diabetes related materials for health professionals and consumers
<http://www.eatright.org/Public/>

The Missouri Department of Health and Senior Services, Diabetes Prevention and Control Program has a web page that provides information on diabetes and links to numerous diabetes related web sites
<http://www.dhss.state.mo.us/diabetes>

The Missouri Department of Health and Senior Services, Division of Community Health has a nutrition website that has program materials, recipes, and tips you can directly download
<http://www.dhss.state.mo.us/MissouriNutrition/>

For more information on community health centers that provide sliding-scale fee services, contact:

Missouri Primary Care Association
3325 Emerald Lane
Jefferson City, MO 65109
(573) 636-4222
<http://www.mo-pca.org>

National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health (DASH), offers a good overview of adolescent health issues and major health risk behaviors
<http://www.cdc.gov/nccdphp/dash>

National Center for Chronic Disease Prevention and Health Promotion, Diabetes Public Health Resource
<http://www.cdc.gov/diabetes/index.htm>

National Center for Education in Maternal and Child Health, Maternal and Child Health Library has a knowledge path about diabetes in children and adolescents
http://www.mchlibrary.info/KnowledgePaths/kp_diabetes.html

The National Institute of Diabetes and Digestive and Kidney Diseases has guidelines on obesity and nutrition
<http://www.niddk.nih.gov/health/nutrition.htm>

National Diabetes Education Program (NDEP)

“Helping the Student with Diabetes Succeed: A Guide for School Personnel” School Guide
<http://ndep.nih.gov/materials/pubs/schoolguide.pdf>

School Personnel Resource Web Page:
<http://ndep.nih.gov/resources/school.htm>

Carbohydrate Counts and Exchange Values for Fast-Foods
http://diabetes.about.com/cs/nutritiondiet/a/fast_food_guide.htm

“Carbohydrate Counting: As Easy as 1-2-3” Joslin Diabetes Center, Harvard University
<http://www.joslin.harvard.edu/education/library/wcarbsug.shtml>

Bilingual information on diabetes and nutrition
<http://www.multiculturalhealth.org/>

Types of Insulin

Product	Manufacturer	Form	Strength
Rapid Acting (onset less than 15 minutes)			
Humalog (insulin lispro)	Lilly	Human	U-100
Humalog Cartridges (1.5 ml and 3 ml)	Lilly	Human	U-100
NovoLog (insulin aspart)	Novo Nordisk	Human	U-100
Humalog Prefilled Pen (3 ml, packets of 5)	Lilly	Human	U-100
NovoLog PenFill (insulin aspart) (3 ml)	Novo Nordisk	Human	U-100
NovoLog Mix 70/30*	Novo Nordisk	Human	U-100
NovoLog Mix 70/30 Flex Pen* (3 ml)	Novo Nordisk	Human	U-100
Short Acting (onset ½-2 hours)			
Humulin R (regular)	Lilly	Human	U-100, U-500
Iletin II (regular)	Lilly	Pork	U-100
Novolin R (regular)	Novo Nordisk	Human	U-100
Novolin R PenFill (3 ml)	Novo Nordisk	Human	U-100
ReliOn/Novolin R (regular)	Wal-Mart Pharmaceuticals/ Novo Nordisk	Human	U-100
Intermediate Acting (onset 2-4 hours)			
Humulin L (lente)	Lilly	Human	U-100
Humulin N (NPH)	Lilly	Human	U-100
Iletin II NPH	Lilly	Pork	U-100
Novolin L (lente)	Novo Nordisk	Human	U-100
Novolin N (NPH)	Novo Nordisk	Human	U-100
Novolin N PenFill (3 ml)	Novo Nordisk	Human	U-100
Long Acting (25 hours)			
Humulin U (ultralente) (onset 4-6 hours) (24 hours/once per day)	Lilly	Human	U-100
Lantus (insulin glargine) (onset 1.1 hours) (24 hours/once per day)	Aventis Pharmaceuticals	Human	U-100
Mixtures			
Humulin 50/50 (50% NPH, 50% regular)	Lilly	Human	U-100
Humalog Mix 75/25 (75% insulin lispro protamine suspension and 25% insulin lispro rDNA origin)	Lilly	Human	U-100
Novolin 70/30 (70% NPH, 30% regular)	Novo Nordisk	Human	U-100
Novolin 70/30 PenFill (70% NPH, 30% regular; 3 ml)	Novo Nordisk	Human	U-100

*Novolog Mix 70/30 is 70% insulin aspart protamine suspension and 30% insulin aspart injection.

Forms Index

<i>Form Title</i>	<i>Location Page Number(s)</i>
Diabetes Health History Form and Management Planning Tool	3-4a
Draft HIPAA-Compliant Authorization for Exchange of Health & Education Information Sample	5
Draft HIPAA-Compliant Authorization for Release of Health Information Sample	5a
Prescription Medication Order and Permission to Administer Medication and to Test Blood Sugar Form	6
Letter to Health Care Provider Regarding Health Care Plan - Sample.....	7
Emergency Action Plan – Diabetes Healthcare - Sample 1	8-9, 106-107
Health Services Department Emergency Plan – Diabetes Sample 2	10, 108
Staff Training Record	11
Blood Glucose and Insulin Procedures.....	12
Expectations of the Student in Diabetes Care	13
Health Services Blood Glucose Record	14
504 Dietary Plan - Sample.....	15, 70
Meal Plan - Sample.....	16, 71
Individualized Health Plan (IHP) - Sample.....	17-20
Individualized Health Plan (IHP) Blank Form.....	21
Special Health Care Needs: Administrative Guidelines (504 Plan).....	22-28
504 Plan Accompanying Forms	29-51

Sick Day Rules

Illness is a stress that can lead to poor glucose control in both type 1 and type 2 diabetes. It can frequently lead to ketoacidosis in type 1 diabetes. When a patient is ill, changes in diet, medications, and monitoring may be necessary to maintain stability. The following guidelines are recommended during periods of illness.

I. MEDICATION

- A. Patient must continue to take routine insulin (even if vomiting and unable to eat) or oral diabetes medication; may be necessary to switch to insulin temporarily or to change dose, but this is based on glucose test results and on advice from health care provider.
- B. Patients taking insulin may require supplemental regular/rapid acting insulin every 3-4 hours based on glucose results and advice of health care provider.

II. MONITORING

- A. **Blood Glucose:** should be tested at least every 2-4 hours; fingerstick measurements may not be reliable when glucose >400 mg/dl (>22.2 mol/l).
- B. **Urine Ketones:** if glucose >240 mg/dl (>13.3 mmol/l), urine should be tested for ketones every 2-3 hours; patient should report moderate to large ketone levels to health care provider.

III. NUTRITION

- A. **Fluid Replacement:** To prevent dehydration, which may be related to fever, diarrhea, nausea, and vomiting, at least 4-8 oz water or other fluids (caffeine-free, sugar-free drinks such as broth, tea, water, diet soda) should be consumed

hourly, for a total of 8-10 cups of liquid a day. Broth is good for replacement of salt lost with dehydration. When regular meals cannot be consumed, carbohydrates in meals should be replaced with fluids or soft foods. If the individual is nauseated or vomiting, small sips of fluids or ice chips should be taken every 15-20 minute. An antiemetic is often required.

Examples of fluids containing 10-15 grams carbohydrate:

- 1 cup soup*
- 3/4 cup cream soup made with milk
- 1 cup Gatorade
- 1/2 cup fruit juice
- 3/4 cup regular ginger ale
- 1/2 cup regular soda

If blood glucose is >240 mg/dl, choose mostly sugar free liquids like water, diet soda, sugar free popsicles®, sugar free gelatin, tea, or broth.

Because caffeine acts as a diuretic, the fluids consumed should be caffeine-free

- B. **Meal Replacement:** When patient is again able to consume food, small, frequent meals containing 10-15 grams of carbohydrates can be taken every 1-2 hours.

Examples of food containing 10-15 grams of carbohydrates:

- 1/2 cup sweetened gelatin
- 1/2 cup mashed potatoes
- 1 slice toast/bread
- 1 *regular* double popsicle

*Soup made with broth does not contain carbohydrate and should not be used to treat a low blood glucose reaction.

- 1/2 cup *regular* pudding
- 3 graham crackers
- 1/2 cup sherbet
- 1/2 cup custard
- 6 vanilla wafers
- 1/2 cup ice cream
- 1/2 cup cooked cereal
- 6 saltine crackers

IV. WHAT HEALTH CARE PROVIDERS SHOULD ASK PATIENT WHEN PATIENT IS ILL

- A. **Length of illness**
- B. **Glucose and urine ketone levels:**
>240 mg/dl [13.3 mmol/l] and moderate to large ketone level)
- C. **Presence and duration of diarrhea, nausea, or vomiting** (>4 hours)
- D. **Change in body weight since onset of illness**
- E. **Any other symptoms** (e.g., abdominal pain)
- F. **Fever** (>101°F)
- G. **Medications** (dose, times of insulin injections, injection sites, and other medications taken)
- H. **Quantity and kinds of food and fluids consumed during day**

V. USE OF INSULIN PUMPS WHEN SICK

Illnesses are treated slightly different when the patient is using an insulin pump. What needs to be done is dependant on the current blood sugar level. The following are some general guidelines for illness management.

- A. During **ALL** illnesses, blood sugar may be harder to control, so there is a need to test blood sugar more often to maintain good control.
- B. It is important to **ALWAYS** keep some sources of quick sugar available. These will be helpful during sick days if blood sugar is running on the lower side. Regular popsicles and lollipops are suggested (not the sugar-free kind).

Adapted from: "The Diabetes Ready-Reference Guide for Health Professionals". 2000. American Diabetes Association, Inc. Department of Health and Senior Services , *Missouri Diet Manual*, 9th Edition, 2003.